

The National Diabetes Education Program, Changing the Way Diabetes Is Treated

Comprehensive diabetes care

The National Diabetes Education Program (NDEP) was initiated in 1997 jointly by the National Institutes of Health and the Centers for Disease Control and Prevention to promote early diagnosis and to improve the treatment and outcomes for people with type 1 and type 2 diabetes. This partnership now involves over 200 public, voluntary, and private organizations dedicated to improving the lives of people with diabetes.

Because of the Diabetes Control and Complications Trial (DCCT) findings that improved blood glucose control markedly reduces the risk for retinopathy, nephropathy, and neuropathy, the NDEP initially focused on blood glucose control (1,2). This month, the NDEP and its partners are launching an expanded initiative to promote optimal control of lipids and blood pressure, in addition to optimal control of blood glucose.

The impact of cardiovascular disease on mortality and morbidity in people with diabetes has been known for years. Approximately two-thirds of people with diabetes die from cardiovascular disease (coronary heart disease, stroke, and other vascular diseases). Recently, data from the National Health and Nutrition Examination Survey showed that over the past 30 years there was a 27% decline in age-adjusted heart disease mortality in women without diabetes, but in women with diabetes, there was a 23% increase (3). In men without diabetes, there was a 36% decline compared with a 13% decline in men with diabetes. On a population basis, cardiovascular disease is the most costly complication of type 2 diabetes (4). The American Heart Association has officially identified diabetes as a risk factor for coronary heart disease (5).

Recent studies have provided greater understanding about the relationships between diabetes and cardiovascular disease, as well as evidence of the benefits of

controlling blood lipids and blood pressure in people with diabetes. For example, the U.K. Prospective Diabetes Study (UKPDS) showed that the risk factors for coronary heart disease in type 2 diabetes were, in order of importance, increased LDL cholesterol, decreased HDL cholesterol, hypertension, hyperglycemia, and smoking (6). Dyslipidemia also contributes to the risk of renal disease. Two studies using the statin class of drugs have shown that rigorous lipid reduction therapy can reduce the risk of coronary heart disease in patients with diabetes (7,8).

Hypertension accelerates the rate of progression of diabetic renal disease. Control of blood pressure as well as glucose retards this progression (9). Lowering blood pressure in a subset of the UKPDS subjects to a mean of 144/82 mmHg reduced the risk for stroke, diabetes-related deaths, heart failure, microvascular disease, and retinopathy up to 56% (10). Other studies support the importance of blood pressure control, as well as the benefits of specific agents (11,12). ACE inhibitors provide effective first-line drug therapy for hypertension, because these agents have been shown to prevent or delay diabetes-associated renal and cardiovascular disease (9).

The evidence that the burden of diabetes can be significantly reduced by early, rigorous, therapeutic intervention is unequivocal (13). The DCCT and the UKPDS demonstrated that intensive blood glucose control for patients with type 1 and type 2 diabetes significantly reduced the risk for retinopathy, nephropathy, and neuropathy (1,6,14). Epidemiological analysis of the UKPDS data showed that for every 1% reduction in HbA_{1c}, the relative risk for microvascular complications decreased by 37%, diabetes-related deaths by 21%, and myocardial infarction by 14% (6,14). For each 10-mmHg decrease in mean systolic

blood pressure, the relative risk for microvascular complications decreased by 13%, diabetes-related deaths by 15%, and myocardial infarction by 11% (15). A recent study conducted in a staff model health maintenance organization found that a sustained reduction in HbA_{1c} levels among adult patients with diabetes was associated with significant cost savings within 1 to 2 years of improvement (16).

At least two-thirds of people with type 2 diabetes are overweight (17). An excess of calories, a high-fat diet that yields positive energy balance, and a sedentary lifestyle all contribute to obesity and type 2 diabetes (18). A prospective 12-year study of 4,970 overweight people with type 2 diabetes found that intentional weight loss was associated with a 25% reduction in total mortality (19). In summary, these studies show that rigorous management of diabetes is both efficacious and cost effective.

A proactive management plan for the control of glycemia, lipid levels, and hypertension should have defined goals and targets and should meet accepted clinical guidelines (20). Optimal control of blood glucose, lipids, and blood pressure usually requires regular physical activity and a meal plan designed to lower blood glucose and dietary sodium, thus altering lipid patterns and inducing weight loss. Lipid-lowering drugs, antihypertensive drugs, and blood glucose-lowering drugs are necessary if the response to altered food intake and exercise is inadequate.

The NDEP's messages, strategies, and tactics are science-based and consistent with the American Diabetes Association (ADA) and other national guidelines, as well as national outcome-focused programs, such as the Diabetes Quality Improvement Program, and they are designed to improve health care provider practice and patient outcomes. To reduce the gap between current and desired pa-

